PLASTICS

A Periodical Devoted to the Manufacture and Use of Composition Products

APRIL, 1926

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Hydraulic Equipments for Moulding, preforming, polishing, cake forming, sheeting, extruding, blowing, embossing, dehydrating and hydrostatically pressing, Bakelite Condensite Redmanol, Celluloid, Fiberloid, Pyralin, Viscoloid, etc., or compounds of Shellac, Rubber, Casein, Bituminite, Gelatine, etc., known under various trade names.

Hydraulic—Rod Presses, Rodless Presses, Semi-Automatic Presses, Tilting Head Presses, Angle Presses, Guns, Sheeting Machines, Pumps, Accumulators, Valves, Packing, etc.

Moulds—Plain or Direct Heated, Flash, Positive, Semi-Positive, Sub-Cavity, Multi-Cavity, Internal Pressure, Core Covering, Hand, etc.

Specialties—Steam Plates, Cast Iron; Steam Plates, Machine Steel; Gas Plates, Electric Plates, Swing Joints, Blanking Rolls, Ball Turning Lathes, Ball Grinding Machines, Edging Machines, Paper Cutters, Blowing Presses, Hobs, Dies, Die Engraving, Tool Making, Special Machinery, Designing, etc.

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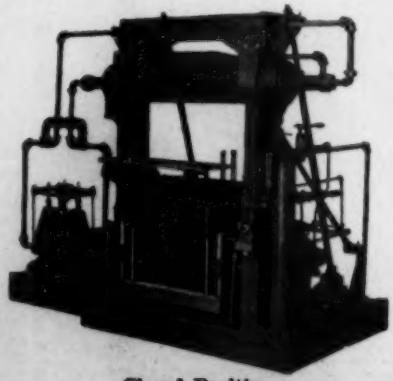


Closed Position

Embodies the following features:

Direct heated and chilled mould.

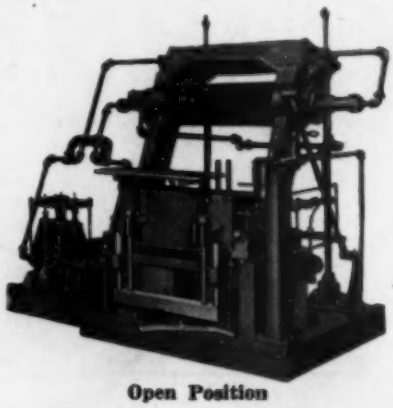
Automatic ejection of moulded pieces.

Centralized valve control.

Hydraulically operated steam and water distributing valve.

Head Tilts giving unobstructed view and access to upper and lower dies.

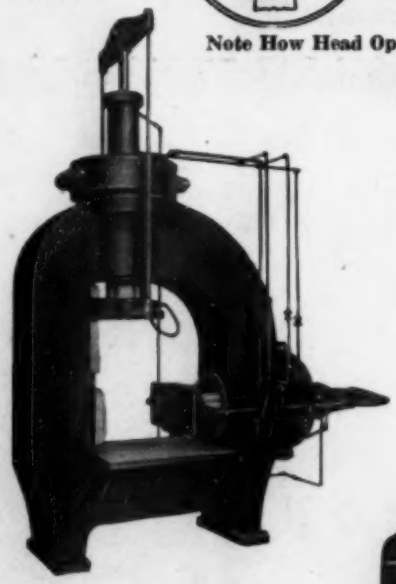
Short stroke due to Tilting features low water consumption.



Open Position

We build this type of press in three standard sizes. Can build to suit your requirements.

Note How Head Opens Like a Book



ANGLE MOULDING PRESS

(Patented)

Rodless Type for Production moulding with direct heated and chilled moulds for moulding pieces requiring split dies.

RODLESS HYDRAULIC PRESS FOR HAND MOULDS

Simple, compact, rigid construction, no rods to stretch or nuts to work loose, insures parallel surfaces between platens. Built in any size or power.

PLASTICS is such a versatile subject that we have often been importuned to add other lines than those already covered, to the editorial contents of the magazine.

The wealth of material available, however, on the thermoplastic materials, and especially on hot molded goods, almost precludes our heeding this request. For example, we have been asked to include such materials as Plaster of Paris work, commonly called "Plastic work," and which is used so widely in interior decorating, especially of theatres. The artificial wood and artificial marble products, which, it is true, are quite plastic when first put up or laid, were also considered by some of our advisers as coming within the scope of our publication.

However, be that as it may, we have to draw the line somewhere. Primarily our object has been to cater to and interest the fabricator and producer of the more strictly speaking "thermoplastic" materials. In so doing we have been accused of favoring the synthetic plastics and casein products. But have we? Pyroxylin and its modifications play too important a role, both in the plastic field and in our own experience, to ever be relegated to the proverbial back seat. On the contrary, we aim, and hope to accomplish much, to further the use of the pyroxylin products, as well as all other products that enter the plastic field.

PLASTICS is intended to be the friend, counsellor and adviser of all those whose labors bring them into contact with materials that can be shaped by molding and hence fabricated by mass production methods. If we have apparently slighted some ones' pet product—then our apologies.

After all, human nature is such that everyone thinks his own child the prettiest. But then, its a large world, and there is room for us all.

What say you?

The Publishers.

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Vol. 2 APRIL, 1926 No. 4

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Carl Marx, B. Ch., Editor
Julia Greenfield, B. C. S., Associate Editor
William C. Segal, B. S., Associate Editor
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Cold Molding Has Advantages

Mass Production Speeded Up by Pressing, Followed by Heat to Harden the Products

By W. F. Lent

Molded products department, Cutler Hammer Mfg. Co.

The requirements of the electrical industries of insulating material compel the use of rapid production methods. The author draws on his wide experience in this field in explaining modern ways of meeting this demand.

THE distinction between Cold Molded Composition Products and Hot Molded lies in the point in the process where the heat necessary for molding is applied. In the Hot Molding process, which is in general better known, the parts are pressed under low or moderate pressures in dies arranged for successive heating and cooling. Examples of Hot Molding are as follows:

1—Shellac compounds, where the heat causes fusion only.

2—Condensation products (Bakelite) where the heat causes fusion and a more or less complete chemical transformation.

3—Hard rubber, where the heat causes a partial cure to be complete after the parts are ejected from the dies.

In the Cold Molding process the parts are pressed under great pressure in dies as room temperature. The parts come from the dies with the required shape and size (except for a small shrinkage) but have at this stage little mechanical strength. Curing is accomplished by heating subsequently under specially controlled conditions. This process which is carried on one or several days after pressing imparts the ultimate strength and heat resistance to the parts.

Strictly speaking, porcelain products are manufactured under conditions that fit the outline given for Cold Molding except that the molding pressures are light and the curing temperatures very high. But what have become known to the trade as Cold Molded Products do not include porcelain.

The Molding compound is composed of a filler intimately incorporated with a binder in the preparation process. The filler is in practically all cases finely divided asbestos. The required heat resistance of the final product and the requirement of the necessary curing temperature, precludes the use of a filler having less heat resistance. The fineness of the asbestos is controlled over a wide range to give on the one hand great strength with long fibers and on the other hand a fine finish and a plastic mix with the shorter and finely divided fibers.

From the chemical standpoint Cold Molded Products are divided into two classes. In the first class are the products using an organic binder suited to applications requiring a heat resistance from 400°F to 500°F. The various manufacturers guard zealously the exact composition of their mixes. However, in general, it may be stated that the binder consists of a carefully selected asphalt or animal or vegetable pitch combined with an oxidizing or semi-oxidizing oil such as castor or linseed oil thinned down with an organic solvent such as benzol. For a special class of products requiring high strength some manufacturers use instead of pitch a synthetic resin.

In the second class are the products using an inorganic binder suited to applications requiring a heat resistance of 800°F to 1000°F. Some of the trade names of the compounds on the market are "Pyroplax,"

"Hemit." The binder in this class of compounds is Portland cement or a mixture of lime and silica.

By far the greatest bulk of the use of Cold Molded Products falls into the first class using organic binder.

Manufacturing Technique

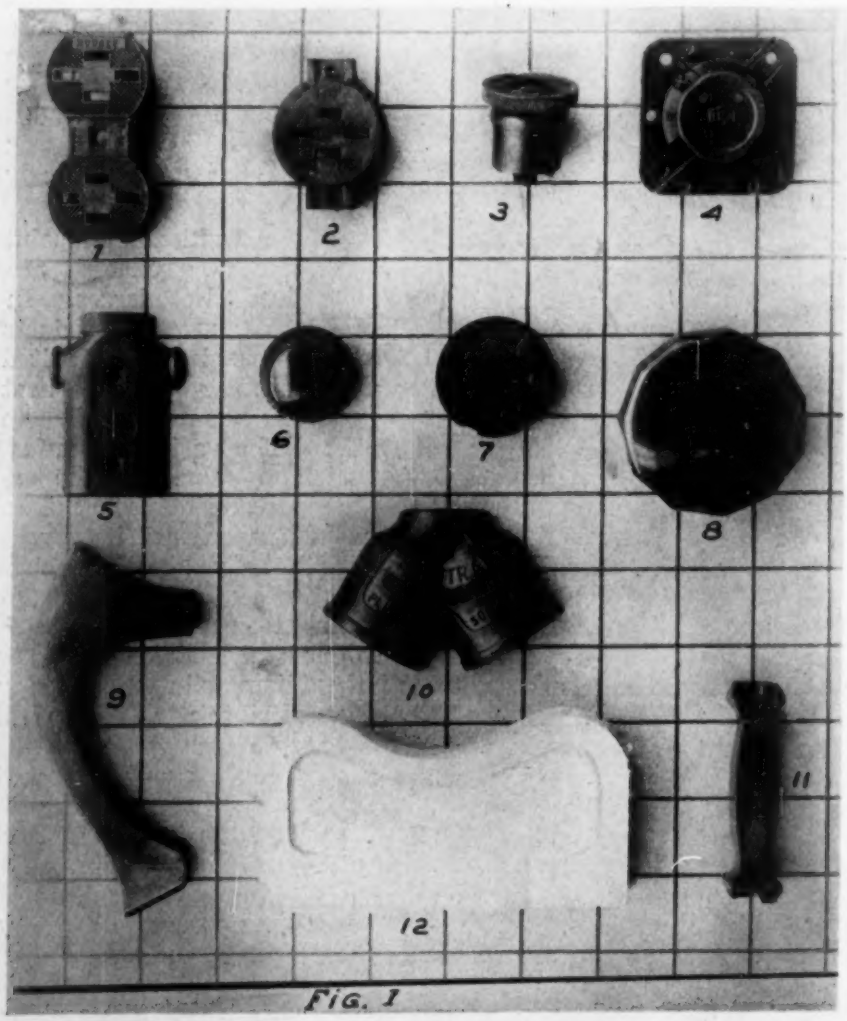
The organic types of binder are made in heated blending kettles. Some manufacturers use quite large and elaborate means for this process to ensure uniformity and low costs. The binder and filler are thoroughly incorporated in a heavy mixing machine. From this mixing, the material is usually passed through a disintegrating mill to break it up to a granulated state. The material is ready to mold after an appropriate screening.

The inorganic types of mixes go through similar operations except that no heat is necessary in the process.

The detailed design of the die is of paramount importance to the economical and satisfactory production of Cold Molded Products. Space will not permit a detailed discussion of this matter. Suffice it to say that the die is composed essentially of a box or molding cavity shaped to the required size and provided with a punch or piston which enters the box at the top after the molding compound has been inserted and provided with a pad or ejector at the bottom for removal of the finished part. The dies must be of hardened steel to withstand the abrasion and high pressure of molding. Metal inserts may readily be located in the dies to remain firmly imbedded in the finished product.

Depending on the shape of the part and the type of material, the molding pressure in the die ranges from 3000 to 15000 pounds per square inch. In order to attain these high pressure hydraulic molding presses have quite generally been adopted, although mechanically operated presses have been used to a limited extent.

The hydraulic presses are of the inverted ram type to enable the ready use of an ejector in the bottom of the die. Pressure is supplied from a high pressure hydraulic line at about 4000 lbs. per square inch supplied by pumps controlled from an accumulator. Inasmuch as Cold Molding is particularly characterized by rapid pressing the operating valve on the press is of a specialized type enabling effortless and rapid control.



The versatility of cold molding methods is graphically shown by the above. The squares are one inch—showing the relative sizes.

Curing

After pressing and before curing it is possible to perform operations on the parts such as drilling and broaching. These operations are not generally economical after curing on account of the abrasive effect of the material on cutting tools.

Curing is accomplished in gas, oil or electrically heated ovens. Control of the distribution and degree of heat is important to obtain uniformity of shrinkage and absence of warping and blistering. Depending on the nature and size of the part the curing time may be a few hours up to several days.

Under finishing operations may be classed all those that follow curing. The removal of fins caused by loose fits in die parts is an important operation. A good lustrous finish may be imparted to a number of cold molding compounds by a polishing operation. Where an accurately plane surface is required for assembly to other parts it is usual to grind the surface.

Application

A discussion of the efficient application of Cold Molded Products necessitates some consideration of the properties of these as well as allied products. The fields of application of the following Molded Products more or less overlap.

1—Cold Molded Products.

2—Condensation Products.

3—Shellac Compounds.

4—Porcelain.

5—Hard Rubber.

The selection of the best material for any given application depends on the relative importance of a number of different properties. A rough account of the comparative properties of these materials is given in the accompanying table in which the numbers refer to the order of excellence of the property in each column. It must be understood that this table deals only in generalizations which may be contradicted under specialized applications, under extremes of variation if composition of materials of the various types and of size of parts. However, we believe the comparisons will be useful.

It will be seen that Cold Molded Products occupy that portion of the field with the requirements of moderate cost, good accuracy and a high heat resistance.

A complete list of the successful applications of Cold Molded Products would show relations to many phases of industry. Originally developed to fill the requirements of wiring device electrical insulation the scope has grown to include a large number of electrical as well as mechanical applications.

The illustrations show graphically a number of typical applications. In these illustrations the parts have been photographed on a background ruled with one inch spacings to give an idea of the size of the parts.

Figure one shows a group of relatively small parts as follows:

	Toughness	Accuracy of Molding	Low Cost	Dielectric Strength	Finish	Heat resistance	Possibility of molding Intricate Thin Sects.	Can metal inserts be molded in?
COLD MOLDED (ORGANIC)	3	3	3	5	4	2	5	Yes
CONDENSATION	2	1	5	3	1	3	2	Yes
*SHELLAC (High Grade)	4	2	2	4	3	5	1	Yes
PORCELAIN	5	5	1	1	5	1	3	No
(High Grade)	1	4	4	2	2	4	4	Yes
*HARD RUBBER								

*These materials vary greatly according to the amounts of shellac and rubber respectively in the composition.

Item 1—Twin flush receptacle wiring device base. Organic Binder.

Item 2—Single flush receptacle wiring device base. Organic Binder.

Item 3 — Attachment plug base. Organic Binder.

Item 4—Radio tube socket base. Organic Binder.

Item 5—Flatiron connector plug half. Organic Binder.

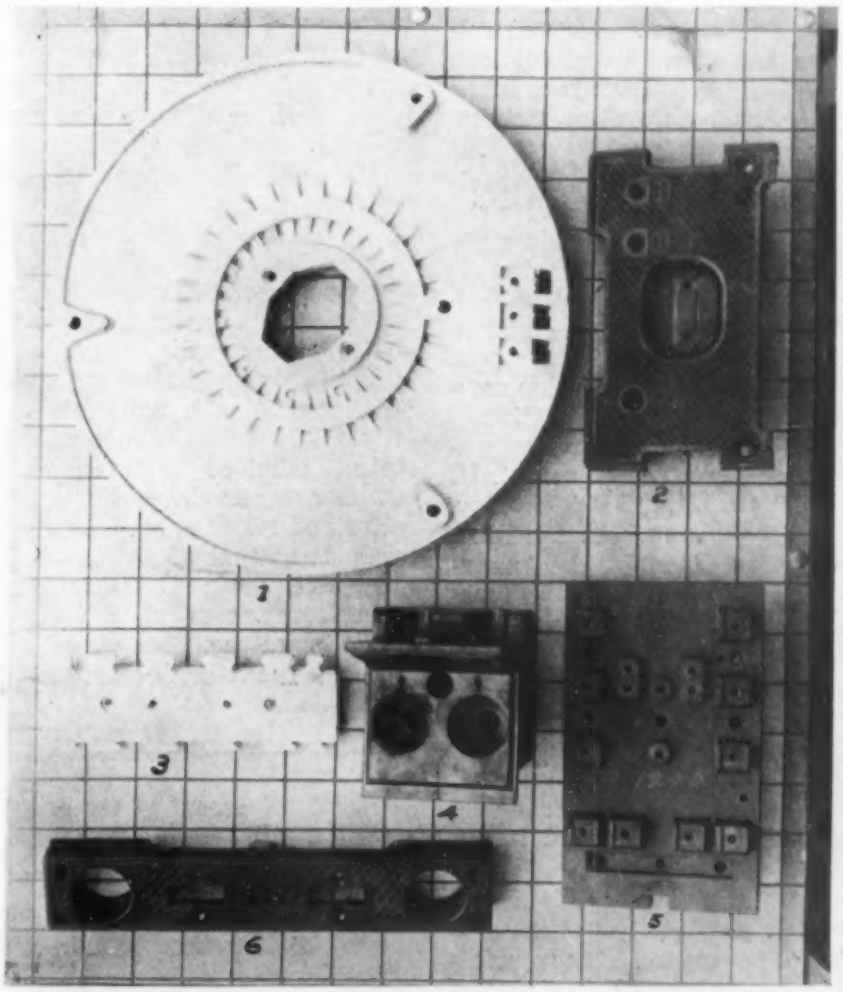
Item 6—Radio Knob. Organic Binder.

Item 7—Radio Rheostat base. Organic Binder.

Item 8—Automobile radiator cap. Organic Binder.

Item 9—Holloware handle. Organic Binder.

Item 10—Twin socket casing. Organic Binder.



Complicated pieces can readily be turned out in large amounts by cold molding followed by heat to harden the binding medium.

Celluloid Ethers Have Promising Future

Ethyl cellusose appears to be exceptionally versatile and allows wide choice of solvents

By William C. Segal

THERE appears to be no question but that the cellulose ethers are destined to play a very important part in the plastic products of the future, as they have properties which have been searched for in vain in the earlier forms of cellulose derivatives. Ethyl cellulose, the preparation of which on a commercial scale is the work mainly of the present inventor, Leon Lilienfeld, has been developed to a high state of perfection as the result of his work and that of the research staff of the Eastman Kodak Co. of Rochester, and a great number of patents on solvents and solvent combinations for this material have been taken out and assigned to the Eastman concern in the past.

Thus far most of the ethyl cellulose combinations were for the purpose of producing films for photographic purposes, but it now appears as though the field of general thermoplastic materials and coated fabrics was about to be invaded by this newer type of cellulose derivative.

This tendency is further emphasized by a recent patent, U. S. Patent No. 1,563,205, Nov. 24, 1925, granted Leon Lilienfeld. This covers the manufacture of plastic insulating materials based upon the cellulose ethers together with suitable plasticizing agents.

The great suitability of the cellulose ethers for the manufacture of plastic and insulating materials is due to the following advantages, as disclosed in the patent:

(1) Their extreme permanency or stability and their extreme neutrality. They withstand being heated in the presence or absence of water and are also resistant to hot alkaline solutions. This stability of the cellulose alkyl ethers and their resistance to water results in an insulating power far surpassing that of all other cellulose derivatives. For example the insulating power of a cellulose penta-ethyl ether in the shape of a cube having a volume of a cubic centimeter amounts to about $1500x_{15.6}$ megohms.

(2) The great suppleness and resistance to chemical and physical influences and the notable toughness and hardness of the plastic masses produced from the solutions or jellies of the ethers of cellulose.

(3) Their property of dissolving easily and readily in a great number of solvents.

(4) Their relative non-inflammability, as compared with cellulose and also as compared with the cellulose nitrates.

Since the number of solvents, both simple and mixed, is large, they may be treated with a very large number of softening agents and colloiding media.

In the present invention combinations of such materials as cellulose nitrates, cellulose formates, cellulose acetates, and camphor or camphor substitutes, resins and resinous condensation products as that of phenols and aldehydes, drying oils, rubber, metallic resinates and oleates, waxes, paraffins, fats and the like with the celluose ethers may be effected.

The development of the cellulose ethers has been rather slower than that of the better known cellulose esters such as the nitrate and acetate. Their extremely valuable properties are however being now recognized.

The choice of solvents is extremely wide. Ethyl cellulose, for example, is soluble in alcohol, methanol (methyl alcohol), glacial acetic acid, formic acid, pyradine, quinoline, picoline, epichlorhydrin, nitrobenzene, ethyl acetate, amyl acetate, butyl acetate, acetone, pentachloroehane, tetrachlorothane, trichloroethylene, acetylene dichloride, carbon tetrachloride, chloroform, naphthalene, turpentine, camphor, phenyl ethers and the like.

If suitable high-boiling solvents or plasticizers are employed, plastic materials of the proper qualities will result. For example 600 parts of a water-insoluble ethyl cellulose or benzyl cellulose are mixed with 400 parts by weight of benzyl cresyl ether or of a high-boiling aromatic hydracarbon, such as meta-dixylylethane, and dissolved in 1800 parts of benzene and 200 parts of ethyl alcohol and kneaded in a vacuum kneading machine for about two hours at a temperature of from 60 to 80°C. Subsequently about one-half of the volatile solvent is evaporated and the resultant mass then either calendered or rolled out into sheets and dried or else applied directly to wires or cables by means of suitable machinery.

In the first instance a laminiform insulating sheet will result and in the second case a well-insulated electrical conductor.

Sixteen claims are appended to the second patent, which broadly cover the plastic materials resulting from the admixture of high-boiling hydrocarbon plasticizing agents with the water-insoluble cellulose ethers.

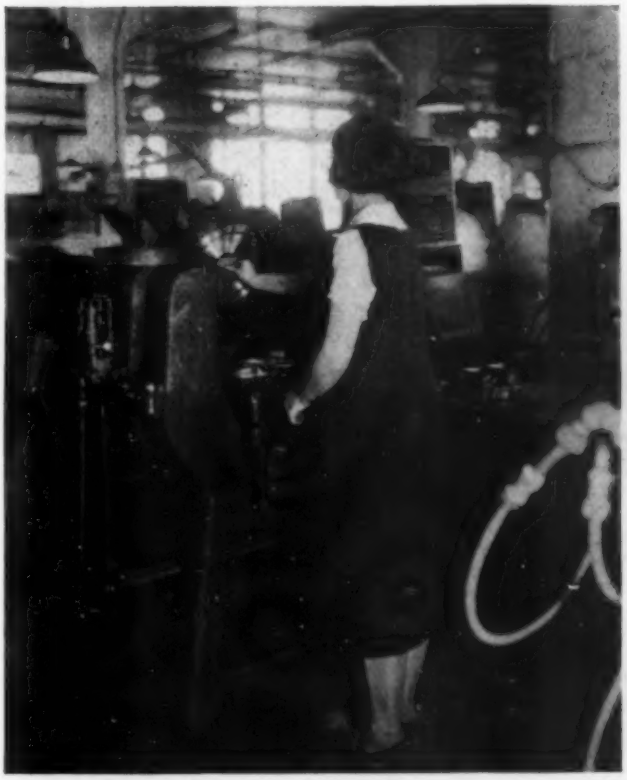
Molding Music into Permanent Form

With the aid of shellac from the Far East, plus engineering ingenuity, millions of records are made yearly

By Carl Marx

The history of the molded sound record and the preliminary steps in preparing the plastic material were discussed in this magazine in February and March.

The moding equipment at the Victor plant is on an upper floor at one of their large buildings. The presses, of which there are about **six hundred,** are of the hinged hydraulic pressure type, of special design made by the company, and so arranged that both sides of the record are made at one pressing.



The actual molding of a phonograph record takes only a few moments—but much skill.

The operation is comparatively simple. A sheet or square of the record mass is placed on a steam table until quite soft, when it is scooped up by the molder and made into a sort of wad or ball. While softening on the steam table, the molder has placed a label on the lower record-matrix; he then places the hot, soft ball of composition over the peg that forms the hole in the record, places another label on top of it and quickly closes the press. The composition flows out under the pressure and heat until a small amount, the "flash" extrudes from the periphery of the matrices. The molder then turns on the cold water that chills the mold, and in about 40 seconds from the time of starting, opens the press and takes out the finished record. The "flash" is broken off and is used in compounding new record stock.

Following this operation, the records are transported to the room where the edges are smoothed off. This is done by women who place the records between two rapidly revolving disc-clutches, throw in the clutch and cause the record to spin rapidly. While it is revolving, they smooth off the edges with emery cloth and polish them with a buffer—all of which takes less time than to tell about it.

The records then go to the testing department where they are subjected to a closest scrutiny for faults and defects. Perhaps the true reason for the remarkable success of the Victor records lies in the painstaking care that is taken throughout every step, rather than in any secret process. Records which to the untrained observer are perfectly all right, are rejected by their trained inspectors, most of them women, and ground up to go again through the process.

Contrary to the molding of synthetic resins plastics, all of the flash and waste of the records can be used up, so that there is no "scrap" problem. The other operations consist of the usual packing, sorting, etc., and present sent no unusual features, except for the tremendous volume of the work carried on.

The Victor Talking Machine Company is the largest buyer of shellac in the world, and can justly claim to be the largest molder of plastic material housed under one roof.

It would lead too far to discuss the nature of the sound-impressions and acoustics, but it has lately been discovered that many of the finer points of the records such as the overtones and fundamental notes had existed in the records for years and had never been heard by man until the engineers of the Bell Telephone Laboratories of New York, working in conjunction with the engineers of the Victor Company evolved the start-

The impressive array of molding presses in the Camden plant of the Victor Talking Machine Co.

back in 1879, and in 1925 another improvement, this time in acoustics, crowns the quarter of century of effort to provide "music for the masses."

The Bakelite Hour

A recent arrival among the prominent broadcasters of worthwhile entertainment, is the Bakelite Corporation. The "Bakelite Hour," from WJZ and associated stations, on Sunday evenings, is always highly enjoyable. The programs alternate with presentations of opera on one Sunday, and a program of vocal and instrumental music on the other. Thus far the programs have been of a very high degree of excellence.

ling new "Orthophonic" Victrola which brings out the overtones and fundamentals of the music with a clarity and sonority that is almost uncanny.

The durability of the modern well-made disc record is quite considerable, and with reasonable care and proper change of needles will give many hundreds of faithful reproductions of the original sounds.

As has been shown the art of telephony also played its part in the development of sound records.

Thus the telephone and talking machine are united throughout their history, as Berliner got his original idea as to shellac records from the work carried out in those laboratories

Polishing the edges of the finished records. All photographs by courtesy of Victor Talking Machine Co.

Trade in Pyroxylin Exceeds Twenty Million

By Thomas H. Norton

IN a recent number of *Chemicals*, pyroxylin is described as consisting essentially of cellulose dinitrate, and that its main uses are for the manufacture of lacquers and plastic materials.

The statistics given are of interest to all consumers of this material. It is stated that in 1921 the production of pyroxylin in solid form was carried on by only four firms in the United States, with a sale of 8,372 tons, valued at $20,855,988.00, as against a value of only $3,778,-374 in 1914. In addition to the amount sold, 2,005 tons were consumed by the same plants for manufacturing other articles.

In 1924 the imports of pyroxylin in solid form amounted to only 9 short tons, with a value of $26,341, with a duty of 40 cents per pound. Finished or partly finished pyroxylin goods imported totalled 555 tons, valued at $1,531,076, with a duty of 60% ad valorem.

The exports for 1924, in pyroxylin and crude pyroxylin products, amounted to 1,002 tons, valued at $2,017,417.00. The value of the manufactured articles shipped in 1924 was $1,045,318.00.

Plastic Materials of Today

A condensed account of the synthetic resin, pyroxylin, casein and other products

By A. Hutin

From Revue generaledes matieres plastiques, 1925,—57, 105, 163

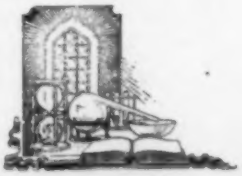
IN the October, 1925, issue of PLASTICS, page 11, there was reproduced an article by A. Hutin, entitled "Modern European Plastic Materials."

Recently the same author has written another article on the same subject, and in the course of it gives a short account of a large number of plastic materials at present on the market, many of which are not very well known or perhaps entirely new to American readers.

While no pretense is made at completeness, the information is undoubtedly welcome to many as the various materials and names are occasionally mentioned without any explanation as to the nature of the substance of which they are composed, or their makers.

In order to enable our readers to more rapidly find a given material once they have noticed it, we have re-cast the article into alphabetic form according to the English names, as far as the nature of the material admitted of doing so. Wherever possible, the name of the manufacturer is given, although in some cases the location of such producers is not stated by the writer in the foreign journal from which this account is taken.

Quite a number of American plastics have been added by the translator.



Aladdinite. Casein product. Aladdinite Co. Orange, N. J.

Albertol (K. Albert and L. Behrend, Amoeneburg, Germany. German Patent 301374). Resinous condensation products of phenol and formaldehyde, which are in the soluble and fusible state, are acted upon by rosin or an alkali rosin salt, while heated.

Algine. Algae (sea-weed) is treated with alkalies or with hydrochloric acid, depending upon whose process is used, and sometimes also with permanganate. Algine forms salts known as alginates, which are insoluble and have many of the properties of horn. It can be mixed with rubber and gums and worked up into a variety of plastic materials.

Ambroine. (also called Stabilite). Copal resin is melted and mixed with insulating fibers.

Ammonium sulfide—formaldehyde resin. (S. Dieser, German Patent 246,-038.) This resin, which is soluble in chloroform and tetrachloro ethanes, is said to be poisonous.

Bakelite. Phenol-formaldehyde synthetic resin. Bakelite Corp. New York; also Bakelite Gesellschaft, Germany.

Bakelite-dilecto, Bakelite-impregnated laminated panel material.

Baleinite (Marzahn). 10 parts of rubber, 2 parts of shellac, calcined magnesium oxide, sulfur and antimony sulfide are mixed, vulcanized and hardened.

Bernite. A substitute for horn. Composition not recorded.

Bois durci. French name for indurated wood-like product made by the Compagnie Generale d'Electricite of France. Washed curdled blood is treated with calcium acetate and mixed with wood flour and pressed.

Carnalithe. (Barthelemy). A casein plastic made by grinding casein with sodium sulfate and treating it with formaldehyde-bisulfite solution. By the addition of camphor a material suitable as a substitute for mother-of-pearl can be obtained.

Caseilithe. A casein plastic made from casein, glycerol, camphor, cellulose nitrate, boric acid and alcohol, finally being hardened with formalin.

Casein plastic, (Richard Weiss, German Patent 313881) Casein is softened by the addition of Turkey-red-oil.

Casein, purified. Gateau has a French Patent 352532 for purifying casein by an electrical method.

Casoide. A casein plastic quite similar to Galalith.

Celeron. A phenol-resin, usually found in the form of laminated impregnated sheets for radio panels and the like. American product.

Celluloid. First practical pyroxylin plastic, invented by J. W. Hyatt, Celluloid Co., Newark, N. J.

Celluloid Lehmann. See Celluloid de Socker.

Celluloid de Socker. (also Lehmann) Agar-agar jelly is mixed with waxes, oils, starch and casein.

Cellulose, colloidal, see Plausons colloidal cellulose.

Cerite. (Clement & Riviere, France). A lacquer suitable for porcelain and the like, made from phenol and formaldehyde.

Clemateite. (Made by Vallorbe, Switzerland and sold by Petrier, Tissot and Raybaud, Lyon, France). A cheap electrical insulating material containing tar, asbestos and other inert fillers.

Cohen's Elastic Mass. (E. S. A. Cohen). Aluminum stearate and aluminum palmitate, or the corresponding iron, manganese or chromium salts, are dissolved in an hydrocarbon having a high boiling point. The solution is then heated with tung oil or linseed oil to 225 to 230°C, and mixed with regenerated rubber, and sulfur.

Condensite. A phenol-formaldehyde resin, usually applied to radio and insulation; a laminated product for panels. Originated by Condensite Co. in the U. S. A., now controlled by Bakelite Corporation.

Cornite. A horn-substitute made from waste buffalo horn, which is broken up, and united by means of heat and pressure.

Cornoid. Name of a horn substitute, constitution not further designated.

Cumar. See Cumarone resins.

Cumarone resins. Made by action of sulfuric acid on solvent naphtha. Associated with Indene resins. Made in America by the Barrett Mfg. Co.

Decorite (Dr. Raschig, Ludwigshafen, Germany) A typical phenol-formaldehyde resin.

Dermatine (Dermatine Co., Ltd., London.) Contains gutta-percha substitute, sulfur powder, antimony sulfide, iron oxide, asbestos, clay, zinc oxide, zinc sulfate and ammonium carbonate. An insulating material.

Diamond fiber. Both vulcanized fiber and phenol-resin impregnated products. Diamond State Fiber Co. U. S. A.

Dioferrite. A mixture of Bakelite with Maisine, which see.

Durate. A vulcanized fiber type.

Durite. A vulcanized fiber type of product.

Ebenite. (made by Etablissements Grivolas, France). An imitation of Bois Durci, which see.

Ebonite substitute. (Steinitzer, German Patent 305624) Condensation product of phenols and furfural with an acid catalyst.

Elastes. A caoustchouc substitute made in France by the Societe Francaise, from gelatin.

Electroine. Plastic insulating mass, composition not disclosed, made by Etablissements Grivolas, France.

Electromateriel. A mixture of mica and plastic biners, made into sheets etc., serving as mica substitute. Sold in France and Germany under above name.

Erinoid. A casein plastic, originating in England, but now internationally known. Also manufactured in the United States. Suitable for artificial ivory, artificial amber, artificial pearl, coral or ebonite. Manufacturer: The Erinoid Co., New York.

Ernolith. (H. Bluecher and E. Krause, of Leipzig, Germany.) A plastic mass made from yeast and brewery waste. The yeast, etc., is treated with formaldehyde or acetaldehyde, mixed with tar or tar-oils, dried and pulverized. The powder is thermoplastic and can be molded at 80°C under a pressure of 180 kilograms per square inch.

Eshalite. Mixture of asbestos, zinc carbonate and coal dust.

Estenite. Mixture of cellulose, asbestos or hornblende powder, magnesia and lime or chalk.

Fiberloid. Pyroxylin plastic of the celluloid type. Fiberloid Co., New York.

Foord's casein plastic. A mixture of pulverized cocoanut shells and casein which has been treated with lime. Potassium silicate is also added to the product.

Fordite. Re-claimed rubber and rubber plastic made by Ford Motor Co., for steering wheels, battery cases and covers, etc.

Formica. Name given to a Bakelite-pregnated laminated material for electrical panels, radio, etc.

Galalith. (International Galalith Gesellschaft Hoff & Cie.). The well-known European casein plastic made from casein which is dissolved in alkalies, precipitated by acids, washed free from acid, ground, formed and hardened with formaldehyde.

Galalith Hoff. (French Patent 322554.) Organic material such as hoofs, animal hair and similar keratin material is treated with caustic soda and the solution used in conjunction with an alkali caseinate for forming plastic casein products.

Gawan's Horn product. Horn scrap is boiled with tar or asphalt.

Geloid. A gelatin plastic made by Urbain Thuau in France (?).

Glyptal. Glycerol-phthalic acid condensation product, General Electric Co., Schenectady, N. Y.

Gomme acroide. An imitation of gum acaroid made by nitrating the resin of xanthorrhea hastilis, which is from an Australian tree.

Gummite. (Cie. Generale d'Electricite, France). An insulating material made from tar, rosin and hornblende.

Hevenoid. (Gerner's). A mixture of rubber, sulfur and camphor.

Hofmeier's Horn Substitute. Horn scrap, hoofs or the like are treated with a mineral acid at 70°C, then with an alkali, allowed to soften, blended by thoroughly mixing, and then formed and hardened with formaldehyde.

Inda. Casein plastic. American Machine and Foundry Co., Brooklyn, N. Y.

Indene resins. Made from petroleum products and from solvent naphtha by action of sulfuric acid. Usually associated with cumarone resins, which see. Made in America by the Barrett Mfg. Co.

Isolemite. See prialithe.

Karolith. A casein plastic. Karolith Corp., Long Island City, N. Y.

Keratin product, Verinigte Gummuwaren Fabrik, German Patent 134134. Keratinaceous material is hardened by the action of formaldehyde.

Knueppels resin. (German Patent 253437.) Cumarone resins which have been acted upon by air or oxygen while in powdered condition, to increase their melting point.

Lacanite. A shellac-base plastic molded material. Scranton Button Co., New York City.

Lactic acid—formaldehyde resin (Ernest Zimmermann, German Patent 305775).

Lactite. A casein plastic made by hydrating casein and mixing it with alum, borax, lead salts and starch. Suitable as a substitute for onyx, ivory and jade.

Lactite-Lactoite. Made from lactite by the addition of a pyroxylin solution.

Lactitis. A casein product made from milk by the addition of borax, zinc sulfate or copper sulfate. The precipitated metallic caseinate is washed, formed, and dried.

Lactoite. Made from Lactite (which see) by addition of pyroxylin.

Latheroide. A form of vulcanized fiber.

Lederide. Another name for vulcanized fiber.

Lederine. Another name for vulcanized fiber.

Magramite. (form of Bakelite). Name given in Australia to cardboard impregnated with a form of Bakelite.

Maisine. (according to Ritthausen). Corn flour is dehydrated, and extracted with benzine or carbon tetrachloride, and then treated with alcoholic sodium hydroxide or with anhydrous amyl alcohol for 10 hours. The solution obtained is precipitated by the addition of benzine. The dry flaky product is soluble in alcohol at 70°C. It is useful in forming celluloid substitutes and similar products.

Meerschaum, artificial. Casein is gelatinized by treatment with solution of ammonia or alkalies, such as borates, carbonates or phosphates, and mixed with magnesium oxide or zinc oxide.

Micalas. See also Micanite.

Micanite. Made from waste mica which is mixed with a varnish or rubber solution. (Apparently a different product from American micanite.)

Moldite. Cellulose acetate plastic, American Cellulose & Chemical Mfg. Co., New York.

Nixonoid. Pyroxylin plastic of the celluloid type. Nixon Nitration Works, Nixon, N. J.

Novolak. Soluble phenol resin. Bakelite Corp., New York.

Oyonnaxienne casein plastic. (French Patent 472192). Casein is mixed with a urea derivative or with a fatty or aromatic amine, and then worked up in a manner similar to celluloid.

Paper mache. Well-known semi-plastic mass made from paper waste, adhesives such as starches, dextrin, albumens, etc., and formed and dried.

Pascoline. (Micanite Insulators Co., Ltd.) An insulating material.

Pathe's artificial horn. Horn scrap is gelatinized by means of alkalies, then neutralized, mixed with inert fillers and pressed.

Pearloid. Pyroxylin plastic of the celluloid type with "essence of Pearl" to produce iridescent effect. J. H. Meyer Bros. Inc., Brooklyn, N. Y.

Pertinax. (Marzahn). 100 parts of caoutchouc, 40 parts of magnesia, 50 parts antimony sulfide, 60 parts of coal tar and 25 parts of sulfur and mixed and worked up into plastic form.

Phthalic anhydride—glycerol resin. (Callahan, U. S. Patent 1108329.)

Piroxloid. A pyroxylin plastic of the celluloid type. Piroxloid Products Corp., New York.

Plastic mass from feathers. (M. Matthaey, German Patent 308755). Feather waste is heated to 140 to 160°, treated with dilute sulfuric acid, dried and pressed under considerable pressure.

Plastic mass from fish scales. (U. S. Patent 1264679) (Sakans and Kieto.) Fish scales are treated with dilute hydrochloric acid and then with formaldehyde. Then follows treatment with aluminum sulfate and tannin, whereupon the scales are mixed with glycerol and compacted into a solid mass by means of pressure.

Plastic mass from tannery waste. (Westinghouse, U. S. Patent 1274728). Tannery waste is treated with lime or magnesia and pressed into definite shapes.

Plausons colloidal cellulose. Cellulose is treated in a Plauson colloid mill until a gelatinous solution is obtained. This can be formed in various way. Made without alkali a material somewhat resembling hard rubber can be prepared.

Prialithe. An insulating material made from talcum and magnesium silicate, formed under very high pressure. Quite similar or identical with Isolemite.

Pyradiolin. Pyroxylin plastic material in heavy sheets suitable for radio panels. Pyralin Co. (DuPont de Nemours & Co., U. S. A.)

Pyralin. Pyroxylin plastic of the cel-

(Continued on page 140)

Put Your Products Into The Gift Class

How Landers, Fray and Clark solved the problem of merchandizing table ware

Selling Pxyroxylin or Molded Novelties presents problems quite similar to those that confronted the Connecticut concern.

The fabricator can learn considerable from the methods described here.

AN article of interest and value to manufacturers of children's toilet and table sets, whether of pyroxylin or other materials, recently appeared in Printer's Ink. The writer says that most manufacturers would like to get their products in the gift class. For this reason competition in the gift market has been unusually keen, with the result that each year sees the introduction of a number of unusual gift ideas. It is one of the hardest markets in the world to break into, but few markets pay such rich rewards, both in immediate sales and in repeat orders.

Personal Appeal

How this works out is shown by the recent experience of Landers, Frary & Clark, New Britain, Conn., manufacturers of Universal household products. Included in their line is silver tableware and steel ware with handles and parts of pyroxylin made in their own factory. This company is using the gift market not only to build up a good volume of sales on two new products, but also to get a wider distribution for its two styles of plated silverware.

For years the obvious gift for a new-born baby has been a baby spoon. A favorite present for the child over three years old has been a knife, fork and spoon set. Despite this fact only a few advertisers have made any attempt to introduce a new idea in the merchandising of these wares.

It was right at this point that Landers, Frary & Clark are using their lever to get more sales for these sets. For some years the company has been manufacturing plated ware in two patterns only, both patterns being severely plain. During

these years the pressure of the company's advertising has been brought to bear more on its household products like percolators, toasters, etc., with the result that the name "Universal" has not been so closely connected with silverware as it might have been. The company has had a good sale on its silverware, but nowhere near the sale that it could have had if it had pushed silverware with the same aggressiveness it has pushed its other products.

In looking about for a method of emphasizing its silverware lines the company saw an excellent opportunity in that overlooked item, the set of children's articles. The result has been the Little Lord Fauntleroy Case and the Rolly Bowly and Tiny Tim Case.

The latter set consists of a little fork and spoon. Normally these would be packed in a plain box. But the Rolly Bowly box is something entirely different. In the first place it is made to simulate a book in appearance. On the cover of the book is a picture of a little boy and little girl sitting down at their table before the fireplace to eat their evening meal. A clock on the mantel points to five o'clock. Throwing back the cover, you find the fork and spoon resting on a background of figured cloth into which are worked pictures of little children at play. On the inside of the cover is attached a leaflet which tells the child something about Rolly Bowly and Tiny Tim, the babes who were born in Universal City. This story is told in such a way that the child gets a little lesson in table etiquette.

Anyone who has had to deal with children knows the value of personalizing the everyday things of a child life. When the company tells the child that Tiny Tim is called that because he has four little tines, a step has been taken to win the child's interest. Once the interest is won, it is easy enough to get over the lesson in etiquette.

In this box is packed also a year guarantee. On the other side a paragraph calls attention to the set for larger children. More important, however, is this paragraph:

"This pattern in Universal Silver Overlaid is made in a complete silver service. Ask your dealer to show you the various pieces."

For display purposes the company furnishes the dealer with little cutouts, representing Tiny

(*Continued on page 137*)

EDITORIAL · IMPRESSIONS

Progress of Pyroxylin Cannot be Checked

AS man learns to make use of the products that nature has providentially supplied him with, and improves his methods of utilizing the various raw materials, sooner or later a time arrives when there is either a shortage of the raw material, or some peculiar properties are demanded in the articles he shapes therefrom to cause him to cast about for some substitute.

It is this initiative urge that has led to the discovery and invention of all the numberless "substitutes" that have bidden for the attention of the consuming public. Take Celluloid, for example.

First of all, its discovery was only too plainly caused by the desire to find something to take the place of the expensive and rare elephant tusk ivory, and for many, many years, the chief use of the new cellulose material was for imitations of ivory. Then it was found that it was not only a good imitation, but, in fact, much better than ivory for many uses. Films, for example. The inherent transparency of the material naturally led to the finding of many new uses until its application became well-night universal.

In course of fifty years, celluloid became so well known that to the lay mind it represented almost a natural product.

And then, the desire to make it cheaper, or in some cases to obtain non-flammability, attempts were made to find an "imitation celluloid." The first steps naturally were taken with the other cellulose esters, but, strange to say, not much real commercial progress was made with these until the most recent times.

The desire to use some raw material from other sources led to the utilization of casein, resulting in the recent flood of new casein products that is at present attempting to crowd out the older established material.

But there is no danger that the pyroxylin plastics will suffer any real set back. As in almost every other case recorded in human annals, competition is the life of trade. It may be remembered that when the railways first were built they were the subject of execration on the part of the teamsters of that day. But we all know that they prospered more than ever. The same thing happened with the tailors and the sewing machine.

As new uses are discovered for the casein products, it is an almost forgone conclusion that some entirely new use for celluloid products will be found just through this medium, therefore one helping the other. Mechanical pencils and fountain pens present an object lesson. First intended to give more lively colors than possible with hard rubber, casein tubes were used. Now, due to its greater flexibility and absence of checking, celluloid tubes are coming to the front.

Examples could be recited ad nauseam. So, if your favorite pyroxylin plastic stock appears to stagger and wobble, cheer up better times will come.

Fifty Years Telephony

Practically fifty years have passed since the telephone first became a human necessity instead of a scientific dream.

Along with the marvelous development of this art of communication along electrical lines, molded plastic material played a by no means humble part. Every telephone installation makes use of parts that can only be produced in the stupendous quantities required by rapid hot molding. In the rush for radio, this has perhaps been overlooked by the average person.

No matter where one looks, the art of molding has a firm and tireless grip on the throttle of the machine that runs the wheels of progress.

PLASTICS

On Guard

On page 105, March Plastics, there is a notice regarding the use of the trademark "Brunswick." This, so the Official Gazette of the U. S. Patent Office says, is extended to Bakelite panels and loud speaker horn. We are informed on behalf of the Bakelite Corp. that this use of the word Bakelite has been protested by them and that the necessary correction will be made by the patent office in future publication.

About Time?

FOR several issues the question of a generic all-encompasing name for all celluloid type of products has been before the manufacturers and fabricators. Of course the word "Pyroxylin Plastic" is well intrenched, and fairly descriptive, but a shorter word, certainly not over five letters, is needed. Pyroxylin is hard to pronounce, harder to spell, and to the general uninformed public means exactly—nothing at all.

The entire industry can get behind this drive, put it over once and for all, and reap the combined benefit—as has been done with Rayon.

The general newspaper publicity which would attend the adoption of such a name woud be the best kind of publicity. How about it?

Control of Celluloid Co. Contested

Change of management possible at annual meeting

THAT things have not been going along as smoothly as might be desired is evidenced in the case of the Celluloid Company, of Newark, N. J, Some of the minority stockholders, alarmed at the passing of dividends on the preferred stock of this company, have formed a committee which is calling for proxies to be used at a forthcoming meeting of the stockholders, scheduled for March 30th.

That a contest for control of the Celluloid Company, is iminent, is shown by the tone of the circular letter sent to the stockholders, which reads as follows: To the Stockholder addressed:

"About a week ago the Committee, representing a large number of stockholders of the Celluloid Company, mailed a proxy to each shareholder.

"It does not appear, according to our records, that we have received yours, and we would appreciate it very much if you would forward it to us at your earliest convenience. If you have signed a proxy for the Company's management, this may be revoked by signing the Committee's proxy at a later date.

"The Committee are giving their time to this movement without any expense to the stockholders, in an endeavor to put the Company back on a basis where it may resume dividends.

"Almost fifty per cent of the Common Stock of this Company is owned by women, to some of whom the passing of the dividend has been a serious matter. It is hoped that the large owners of stock, many of whom have already responded, will cooperate with this Committee by favoring it with their proxy.

"It is not the intention of your Committee to make any radical changes at this time, but to cooperate with those Directors who are in sympathy with the movement to bring about a change of policy in relation to certain matters of management. We feel by having the wholehearted support of the stockholders we can accomplish changes we deem essential."

The total stock of the company is slightly over ten million dollars, of which seven million is common stock and three million preferred at eight percent, with a par value of $100 00. While the common stock has been as high as 107 in 1922. It reached bottom at 17 last January. The effect on the preferred stock is evidenced by the declining of this from 111 7-8 in 1923 to 58 in January 1926. Present quotations are, common 18 to 22, and preferred 60 to 63.

The present Celluloid Company, formed in 1890, is a consolidation of the Celluloid Manufacturing Company, Celluloid Novelty Company, Celluloid Brush Company, American Zylonite Company, and the Lithoid Manufacturing Company.

It is stated on excellent authority that there is no real reason for the belief that there are any outstanding financial difficulties confronting the Celluloid Company. The passing of the preferred dividend is at least partially explained by the peculiar conditions in the industry, and by the fact that considerable money was expended in bringing the plant up to date mechanically and otherwise.

Funds so used naturally limit the amount available for distribution, but the enhanced value of the plant and its producing capacity, improved by the additions of new and modern equipment, should, within a reasonable time, allow of the resumption of dividends.

One of the handicaps in the pyroxylin plastic field has been the tendency toward an increasing number of colors and effects. The "pearl craze" is responsible for much of the difficulty, which, due to the passing of the fad for certain color-effects, renders much material obsolete almost as soon as made up. At present there are about seven different colored "pearl" sheets in demand. Although most of this can be made up by compositing clear stock with a colored opaque underlay, upon amber, nevertheless the articles made up from any particular combination, if they prove less popular than some other shade, will remain unsold.

What the industry appears to need most, is standardization, and a return to more healthy conditions and the popularizing of the standard shades.

The use of expensive camphors in the manufacture of different materials will soon be eliminated was the opinion of one of the foremost experts in the industry when interviewed recently by a reporter for Plastics.

The Imperial Molded Products Corporation licensed Bakelite Molders have recently started production in their new Chicago plant. This company is controlled by the owners of the Imperial Brass Mfg. Company, which arrangement assures ample financial backing.

Celluloid As Food

Spartanburg, S. C.—When D. M. Stone, insurance agent at Woodruff, returned to his parked car he found the top had almost disappeared. A goat had devoured it. The animal even consumed the celluloid window.

With the Pioneers IV.

John Wesley Hyatt Created Celluloid

Birth of new industry took place at Albany, N. Y., over fifty years ago

By Carl Marx

A LITTLE over twelve years ago, the chemists of England and of the United States, through the Society of Chemical Industry, accorded a great honor to a man who, although he was not even trained in chemistry, had been the father of a great chemical industry—the manufacture of pyroxylin plastics.

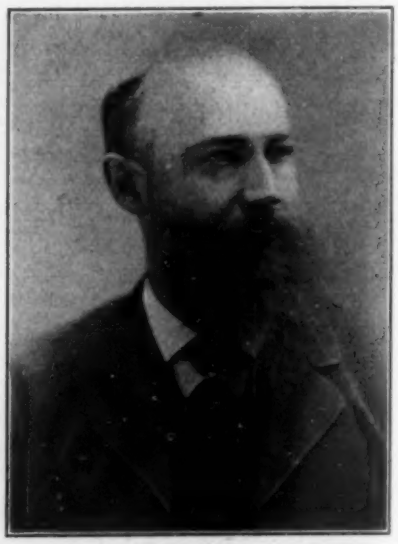
They awarded the highly-prized Perkin Medal to John Wesley Hyatt, one-time printer of Albany, N. Y., who had enriched the world's store of raw materials by inventing what everyone now calls by the familiar name of celluloid.

Much has been written on this subject. The controversy as to who really did invent the pyroxylin plastics has raged intermittently for well over fifty years, and it is no time to again stir up this mooted question. Fact is, that, like all human progress, more than one man contributed. Several outstanding figures in the history of this art were intently working on the problem. The earlier ones,—and at that but a few years—such as Alexander Parkes and Daniel Spill, had found that camphor when dissolved in a solvent such as alcohol, would then dissolve pyroxylin, and allow of the production of more or less plastic materials. That is conceded.

But what Hyatt did, and what has proven by time to be the most important, was to make the manufacture of celluloid *practical*. Hyatt was primarily a mechanic, and applied his mechanical knowledge to the working out of the immensely difficult problems of adapting the newly discovered plastic material to industrial uses.

His outstanding achievement was the independent discovery that camphor *alone*, and without any solvents whatsoever, could, aided by heat and pressure, dissolve and blend with cellulose nitrate, or pyroxylin, to form a thermoplastic mass. This differentiates celluloid from all of other cellulose nitrate plastics that preceded it.

Parkes, undoubtedly made material from pyroxylin, but in every case used great quantities



JOHN WESLEY HYATT
as he looked about 1874, when Celluloid was new.

of castor and other oils to obtain plasticity. His efforts failed. Spill, practically a pupil of Parkes, elaborated upon the idea of combining camphor with pyroxylin, but invariably used comparatively large amounts of solvents. Hyatt, on the other hand, started at the other end. He used camphor and pyroxylin without solvents. It is quite true that he afterwards added some alcohol to lower the melting point of the camphor, but only such small amounts as would be readily and cheaply eliminated.

However that may now be interpreted, the fact remains that celluloid became the one really successful pyroxylin plastic in the days when the patents on it were still valid. The entire operative side of pyroxylin plastic material manufacture is built solidly upon the foundations laid down by Hyatt.

The earlier inventors attacked the chemical side of the problem. Hyatt invented the machinery to make the product commercially, and it is an undisputed fact that the stuffing machines used to produce celluloid rods and tubes, the blocking presses and sheeting devices for cutting thin sheets from blocks, were all inventions and improvements of Hyatt. These machines were improved in time, but the underlying principles have remained unchanged.

Neither Parkes nor Spill can be credited with equal achievements in this line.

John Wesley Hyatt was born on November 28th, 1837, at Starkey, Yates County, N. Y., the son of John Wesley Hyatt and Anne Gleason Hyatt. He learned the printing trade and when but sixteen years of age went to Illinois to practise this art. He soon showed his bent for invention by patenting a family knife sharpener in 1861. He returned to Albany, N. Y., shortly thereafter and became a journeyman printer.

He did not join the union, and the story is told that one night while he was walking down North Pearl Street, three union printers attacked him. But they

had not reckoned with Hyatt's physique, and were unaware of the fact that the young man was the amateur boxing champion of Buffalo. They soon found it out however, for in a moment one was knocked cold, the other had a broken jaw and the third thought it better to beat a stragetic retreat.

This was characteristic of Hyatt. He was not only physically, but mentally as well, a veritable giant, and this physical and mental energy carried him to success.

The actual birth of celluloid took place about 1868 or 1869, although Hyatt had been experimenting with pyroxylin since 1863. His final efforts were directed toward the production of a billiard ball, which he submitted for a prize offered by Phelan and Collender. It is not clear as to whether he ever won the money, but he did succeed in making such good imitation ivory billiard balls that the firm founded by him, the Albany Billiard Ball Co., is still in existence.

The first attempt at true celluloid was made by grinding wet pyroxylin together with camphor until the latter was very finely divided and closely intermingled with the pyroxylin. The mixture was then partially dried between blotting paper and placed in a heated molding press. Enough heat was applied to actually melt the camphor, and although Hyatt had been warned by Prof. Seeley that such a procedure would undoubtedly lead to a serious explosion, nothing untoward happened. But when the mold was opened, there was found a perfectly molded dental plate—the first actually molded piece of what is now called celluloid.

The importance of this was at once recognized by Hyatt, for the rubber companies of that day had a monopoly on the production of rubber dental plates, and an excellent market for the celluloid dental plates was assur-

(*Continued on page 133*)

The new location of the DuPont Viscoloid Company at Fifth Avenue and Thirty-Third Street will afford greater facilities for handling their expanding business, recently augmented by consolidation with the Pacific Novelty Co. The latter concern will remove from its premises at 41 East Eleventh Street to a floor in the adjoining building on Thirty-third Street, to be used for the sheeting department of the concern.

G. A.Gelderman has been advanced by the Shoreham Manufacturing Co., Inc., to the position of assistant sales manager. Mr. Gelderman will continue to cover the Middle West for the Shoreham organization in addition to his new duties.

Lammot du Pont was elected President and Chairman of the Executive Committee of the E. I. du Pont de Nemours & Co. at a meeting held in Wilmington, Del., on March 15. He succeeds Irenee du Pont, who was elected Chairman of the Board of Directors and of the Finance Committee. Lammot du Pont is the eighth member of the family to become head of the organization since it was founded in 1802, and the third brother to become President in succession.

The following manufacturturers will be registered at the Palmer House, Chicago, in order to display their latest offerings of toiletware: J. W. Levy Corporation, Atlantic Comb Works, Art Ivory Co., Fr. Bergner Co., DeLuxe Clock Co., The Fiberloid Corporation, S. Langsdorf Co., Newark Tortoise Shell Novelty Co., Pacific Novelty Co., Paraloid Works, Inc., Wm. Schimper Co., United Novelty Co., and Shoreham Mfg. Co.

Coming in May:

DIE HOBBING

By W. E. Rahm, Engineer of The Burroughs Co.

J. W. Hyatt Created Celluloid

(*Continued from page 131*)

ed by the desire of the dentists for a good substitute.

In the same year Hyatt married Anna E. Taft, July 21, 1869. Financial support for his invention was soon forthcoming and a plant was erected in Newark, N. J. about 1873. From this, although once completely destroyed by fire, has risen what is now the Celluloid Company.

The material itself, contrary to general belief, was not named by John W. Hyatt, but by his brother, I. S. Hyatt, who had been an editor in Illinois, but soon joined his brother in his enterprises.

Other industries also owe their origin to the inventive genius of John W. Hyatt: molding dominoes from shellac composition, 1869; water purifying systems, 1881; roller bearing, 1892; lockstitch sewing machine, 1900, and a method of treating sugar cane for extracting the juice from it economically.

He was one of the few men who lived long enough to see the things they originate grow to success. Although Hyatt never amassed a huge fortune, all of the enterprises started by him have proven to be financially profitable.

Everyone who came in contact with this remarkable man was impressed by his boundless energy, his geniality and human attributes that made for him a host of friends and admirers.

He died at the age of 83, on May 10th, 1920, at his home in Short Hills, N. J. A splendid resume of his life work appeared in connection with the bestowal of the Perkin Medal January 23, 1914, in the Journal of Industrial and Engineering Chemistry, 1914, Vol. 6, pages 90, and 155 to 162.

TECHNICAL ABSTRACTS
AND PATENT REVIEW

MANUFACTURE OF CELLULOSE ESTERS OR ETHERS. N. B. Grillet, assignor to Societe Chimique des Usines du Rhone, France. U. S. Patent 1,566,398, December 22, 1925.

The esterification or therification of cellulose is carried out in rotating tumbling barrels, with or without internal grinding spheres or other stirring arrangement, and in the presence of from two to three parts by weight of a solvent of the cellulose ester or ether formed. Specifically the invention covers the preparation of cellulose acetate. Large quantities of cellulose, up to 1000 kilograms (2,200 pounds) can be treated at one time, the apparatus being suitable cooled by spraying or partial immersion in water or brine. Six claims, the 6th reading: "A process of acetylating cellulose, which consists in executing the reaction in the presence of a liquid solvent of the desired product, the proportions by weight of the solvent being approximately 2 to 3, in a closed vessel in sufficient quantity to occupy 30 to 50 per cent of the capacity of the vessel, and rotating the vessel, thereby to agitate the mixture."

METAL - INSERT PYROXYLIN PLASTIC OPHTHALMIC MOUNTINGS. Elmer L. Schumacher and William H. Boutelle, assignors to American Optical Co. U. S. Patent 1,568,629, Jan. 5th, 1926.

Sheets of pyroxylin plastic are split into rectagonal rods which are then grooved for the insertion of the metallic parts, such as the cables, after which the rods are joined by means of a suitable cement and heat or pressure. After this the parts are milled, turned, swaged or otherwise formed into their final shape, leaving the metal imbedded in the plastic material.

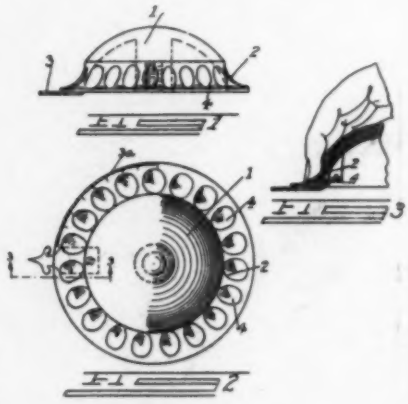
CUMARONE RESIN COMPOSITION. Carleton Ellis, assignor to the Ellis Foster Co., U. S. Patent 1,570,584, Jan. 19. 1926.

The acid retained by cumarone resins due to the action of the sulfuric acid used in the polymerization of the cumarone and indene in solvent naphtha, is neutralized by fusing the resin with neutralizing substances, preferably calcium hydroxide. The melting point of the resin is raised by such treatment. Application of the neutralized cumarone resin for concrete floor varnishes, etc., are disclosed.

EXFOLIATED SHELL MOTHER-OF-PEARL. Sidney Rauschenberg, U. S. Patent 1,570,183, Jan. 19th, 1926.

The mother-of-pearl layer of natural shells, such as abalone or oyster shells is rendered capable of being exfoliated or split into small flakes, by a carefully controlled heat-treatment of the cleaned shells, at from 450 to 500°F. The laminae may be used to decorate such materials as enamel, stucco, cement, plaster and the like, or be incorporated with a varnish for producing decorative effects.

RADIO DIAL. Gregory Desjardins, assignor to Bosworth Electric Mfg. Co., U. S. Patent 1,569,539, Jan. 12. 1926.



The dial, molded from any suitable material, is constructed with cavities along its rim for the balls of the finger tips of the operator, thus allowing of very fine adjustment. While graduations may be placed near the periphery of the dial, it is preferably made with a pointer, the graduations being upon the panel. The appearance is shown by the illustration, above.

ARTIFICIAL RESINS SIMILAR TO BALSAMS. Arthur Voss and the Farbwerke vormals Meister, Lucius und Bruening; German Patent 414,285; applied for May 7th, 1922.

Natural resins are alkylated in the presence of alkaline substances.

PHOTOGRAPHIC FILM NOT SUBJECT TO STATIC ELECTRICITY. Harry J. Hoffman, assignor to the E. I. Du Pont de Nemours & Co., U. S. Patent 1,570,062, Jan. 19, 1926.

The usual method of rendering photographic, especially moving-picture, film not subject to discharges of static electricity when running the same through the camera, printing machine or projector, has consisted in adding some electrolyte material to the dope from which the film was made. The present invention consists in subjecting freshly prepared cellulose ester (nitrate or acetate) film to a surface.

CELLULOSE ESTER AND ETHER PRODUCTS. J. H. Bregeat, of France. French Patent 587,486. Dated Dec. 15, 1923 as based on Austrian application bearing such date.

Absolute alcohol is used in place of ordinary ethyl alcohol (95%) as a solvent for cellulose esters and cellulose ethers.

GERMAN CELLULOID TRADE. Die Celluloid Industrie (Gummi-Zeitung), Nov. 27, 1925, **40**, 541.

A complete resume of the exports and imports of celluloid articles from and into Germany for the period January to September 1925 as contrasted with the same period for 1924. This includes celluloid substitutes as well. The compilation includes camphor; artificial leather (Pegamoid), celluloid collar and cuffs, imitation ivory and tortoise shell, Galalith and similar casein plastics, films, buttons, combs and other toilet ware.

ABRASIVE DISKS WITH SHELLAC BINDER. Harry C. Martin, assignor to the Carborundum Co., Niagara Falls, N. Y. U. S. Patent 1,567,071, Dec. 29, 1925.

Shellac is used in the proportion of 8 parts of the same in powdered form with 92 parts of an abrasive, being molded into a disk and used as a grinding disk. Molding is done under a pressure of from 300 to 500 lbs. per sq. inch, the material having first been heated to the melting point of shellac. Baked again before completion.

HARTSHORN SCALES FOR KNIVES, APPARATUS. E. Kuehn, Jr. U. S. Patent 1,567,739, Dec. 29, 1925.

The invention relates to an apparatus for making artificial hartshorn scales for pocket knives by cutting bone on a special form of rotary cutter so as to produce the characteristic hartshorn depressions. The novelty consists in that the rotary bone-cutters are arranged obliquely to the longitudinal direction of the work-piece and that the slide carrying the latter is adjustable by lateral wedge-like projections on the slide. This causes the cutters to make depressions in the bone at both forward and return movements of the apparatus.

RECENT BOOKS

CHEMISTRY IN INDUSTRY. Edited by H. E. Howe, 1925. The Chemical Foundation, New York. 2 vols. 764 pages. $2.00.

The two volumes comprising the work entitled Chemistry in Industry, are stated to be "a cooperative work intended to give examples of the contributions made to industry by chemistry." The individual chapters are written by well known experts in their particular line, and from the viewpoint of the average citizen, so that the work as a whole really consists of a series of essays on various industries to which the chemist has contributed to a large extent, arranged primarily for the purpose of acquainting the public with this work and to stimulate a general interest in chemistry.

Mainly for this reason, the work is perhaps somewhat elementary from the viewpoint of the chemist and technologist, but this is a virtue in this case, as the treatment of the individual subjects is such that they are interesting as well as entertaining, while at the same time giving considerable information in a small space.

It would lead too far afield from the point of view of Plastics to review all of the forty three chapters, but such as touch upon the art of plastic materials in general will be summarized.

Chapter I, by Robert E. Rose, director of the Technical Laboratory of the E. I. DuPont de Nemours Co., deals with the Foundations of Chemical Industry, and serves as a sort of introduction to the entire work. It will prove very interesting reading to those whose chemical education stopped with their high school course, as it explains the fundamentals in a way easy to understand.

Chapter III, by D. B. Keyes of the U. S. Industrial Alcohol Co., deals with alcohol and the other solvents, many of which are widely used in the pyroxylin industries.

(Continued on page 136)

The discovery and manufacture of synthetic resins, called by the author "A Chemical Contribution to structural materials" is the work of A. V. H. Mory, assistant director of research of the Bakelite Corporation. It gives a lucid account of the discovery of the phenol resins, and of their manufacture and applications.

The manufacture of celluloid flexible films for photography includes an account of the nitration of cotton fo the preparation of cellulose nitrate, making up the film "dope" and the production of the film on drums from which the finished celluloid film base is stripped.

Another chapter deals with the contributions of the chemist to the rubber industry. A very interesting article is that on the contributions of chemistry to aviation, including the production of hydrogen and helium, and the manufacture and application of cellulose nitrate and cellulose acetate "dopes" to airplane wings and fuselages. This also includes a short account of the preparation of cellulose acetate. Casein as a glue for airplane propellers is also described.

Dr. George H. Brother of the Karolith Corporation contributed the chapter on Casein, giving a very comprehensive survey of the many uses of this milk byproduct, including the manufacture of casein glues, paper coatings, casein paints and casein plastics.

As somewhat allied to the plastics industry in general, the article by Albert V. Bleininger of the Homer Laughlin China Co., on earthenware and plastics makes interesting reading. Another art closely added with the cellulose compounds is that of the production of artificial silk or Rayon, which is adequately treated by M. G. Luft of the Industrial Fibre Co.

We can highly recommend the books to anyone at all interested; and when it is considered that practically every form of human endeavor owes something to the chemist, they should meet with universal approval. Both volumes are profusely and interestingly illustrated.

The subjects covered are: Abrasives; Alcohol and other solvents; coal, coke and their products, cotton and cotton products, chemistry in the electrical industry; applications of electrochemistry; chemistry in the fertilizer industry; industrial gases; glass; elements of iron and steel manufacture; leather making; nonferrous metallurgy; packinghouse processes; chemistry in the pulp and paper industry; perfumes and flavors; the petroleum industry; photography; snythetic resins; chemistry in the rubber industry; textile industry; catalysis; aviation; casein; dyestuffs; confectionery; earthenware and porcelain; electric batteries electroplating and electroforming; military and industrial explosives; glues and gelatins; inks; lubricants; matches; paints, varnishes and colors; Portland cement; radio and incandescent lamps; railroad chemistry; rayon; refrigeration; rust-resistant metals; soap and the relation of chemistry to water supplies.

Put Your Products in the Gift Class

(*Continued from page 125*)

Tim and Rolly Bowly. These cutouts can be fastened to the box, and a slit under the arm allows the dealer to insert a spoon or fork. This makes an attractive display piece which will help sales.

The Little Lord Fauntleroy Case is larger, although it, too, is made in the form of a book with a beautifully colored cover showing Little Lord Fauntleroy in his home and also walking about the castle grounds. The pieces contained here are knife, fork and spoon. These are set against a background of dark blue satin.

This book also has a leaflet attached to the cover. This leaflet tells a little of the story of Little Lord Fauntleroy. It shows that he wasn't a sissy, but a real boy. When this point has been emphasized, the company says that he had excellent table manners that the silver set he used was no better than the one contained in the case.

In this package there is also a blue slip. This slip has on its reverse side a message ostensibly addressed to the dealer, but which is meant as much for the consumer as for the retailer. On this slip the company tells about its regular lines of silverware with a number of talking points concerning ,the beauty and wearing value of Universal Overlaid.

On the face of the slip the company offers the consumer a copy of a booklet called "Childhood Days." A coupon is furnished so that the consumer can write the company for a copy of the booklet.

The booklet itself is an interesting record book of behavior. In it the company outlines a schedule of awards, based on a point system. For saying "good morning" the child gets one point. For cleansing the teeth three times a day the child gets nine points. Good table manners win nine points. Outdoor

exercise wins five points.

The company tells the mother to keep these points in spaces provided in the book and at the end of the week to base the allowance on the child's record.

A second enclosure in the package is a green guarantee slip.

Although these packages have been on the market for only a few months, the company has already enjoyed remarkable sales on its children's ware.

It behooves every manufacturer, whether of pyroxylin or any other plastic articles to see if a similar merchandising idea can not be applied to his own line. And while it may not be advisable to follow along this line too closely, the unusual package will undoubtedly add interest and sales to any product.

Button Factories Amalgamate

Rochester, March 28.—Announcement was made by Nelson Sage, president of the Rochester Button Co., of the merger of the Rochester Button Co. with the Shantz Button Corporation, both of this city, and the Superior Ivory Button Co., of Newark, N. J. The merger follows efforts covering four years to bring about the consolidation of these three factors.

The realization of this amalgamation in the ivory button industry is said to mark an important step in effecting economies and will contribute in great measure to elimination of the intensive competition which has characterized the activities of the factories for a number of years, it is believed.

Since each of the companies manufactures distinctly different grades and kinds of buttons, the new company will, it is believed, produce approximately 35 per cent of the button output of the United States, and may develop into the most formidable group in the industry.

It is understood here that the Superior Ivory Button Co., of Newark, N. J., which makes a lower grade of ivory buttons, has been experimenting for several years with various types of machinery designed to effect economies in production. It is said these experiments have made possible certain economies in production which gives it t price advantage over its competitors.

BOOKS

Synthetic Resins and their Plastics.
Carleton Ellis. 514 pages, illustrated. $6.00.

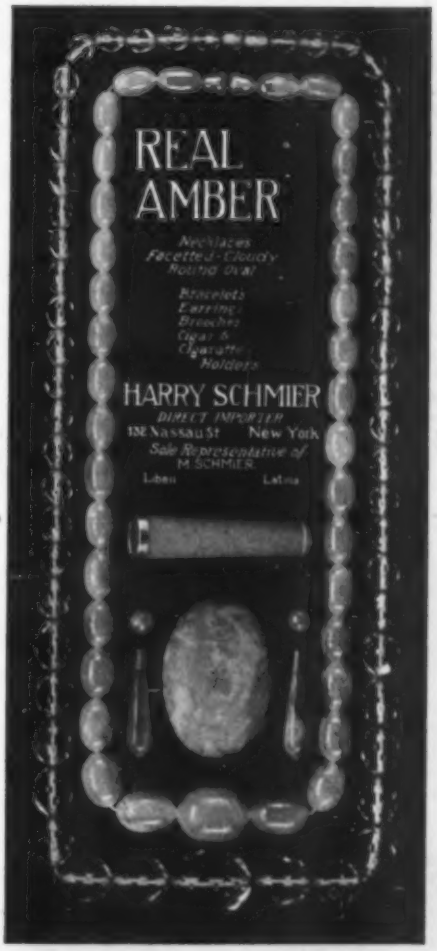
The book will serve as a guide and prove a stimulus to the numerous investigators and practitioners in the field of artificial resins. The section of plastic molding is especially valuable.

Plastics and Molded Electrical Insulation.
Emile Hemming. 313 pages. Illustrated. $5.00.

Very special care has been taken in the preparation of the chapter of molded insulation. Contains hundreds of references to plastic and composition products and their utilization.

Any of the above can be obtained by writing to

Book Department
PLASTICS
461 4th Ave., New York



Plastics of Today

(*Continued from page 124*)

luloid type. DuPont product. Pyralin Co., New York.

Redmanol. Phenol-formaldehyde resin. Bakelite Corp., New York.

Resinite. (Dr. Raschig, Ludwigshafen, Germany). A product consisting of phenols, aldehydes and cumarone resins.

Resistance. See Ambroine.

Ringer's plastic. (German Patent 306025, F. Ringer). Finely pulverized cellulose is treated with alum, glue and rosin-varnish.

Roiterite. Chambournia). A form of vulcanized fiber.

Romalite. .. (Etablissement Grivolas). A plastic material made from rubber resins.

Schwarzenbergs artificial horn. Made from casein. A solution of casein in borax is mixed with starch, paraffin, glycerol and or gelatin, formed into plates, and these treated with aluminum acetate.

Sicalithe. A celluloid-like plastic made by the Societe Industrielle du Celluloid, France.

Societe Cellulose et Papiers, Plastic mass made by this concern is prepared by mixing 40 parts of glue which have been softened with 1 part of water with 20 parts of stearine or a wax, adding 20 parts of wood flour and 20 parts of kaolin (clay), the mixing being carried out at 100°C. Before use it is heated to 60°C and receives an addition of resin, 2% alcohol and 2% glycerol. French Patent 501585.

Stabilite. See Ambroine.

Steinkern Horn-substitute. (Steinkern Industrie Gesellschaft.) 200 kilograms of gelatin, 300 kilograms of "Mendone white" (a pigment), 75 kilograms of potato flour and water are mixed while hot, and then hardened by the addition of tannin and formaldehyde; then dried.

Suring de Krel's Horn Product. Horn waste is treated with hot tar and or asphale.

Tenacite. Plastic product of uncertain composition, made by the Allgemeine Elektrizitaets Gesellschaft of Germany . See also Stability, Ambroine and Resistance, all made by same concern.

Vegetable fiber, compressed. (Maurgeon, French Patent 500206). 88% of glue is dissolved in sufficient water with the addition of 12% of ammonia, and then mixed with casein. The casein solution used contains 1 kilogram of casein in 15 liters of water. Fibrous wood waste is then added, the material compressed until most of the liquid has been extracted, heated to 130°C treated with an antiseptic and indurated with formaldehyde.

Vegetaline Streubel. Dried cellulose is treated with sulfuric acid of 58°Be. at temperatures below 20°C, comminuted and washed. The resulting cellulose product is then dried and powdered and mixed with rosin and a rosin soap. This product can be molded under high pressure to relatively thick masses.

Vulcanized fiber. A product consisting of cellulose which has been treated with zinc chloride. Occasionally antimony or iron oxide is mixed with it, but generally it is simply hardened cellulose.

Wandrite. (Hermann Wandrowsky, Berlin-Friedenau). A phenol and formaldehyde product as far as known.

Wenjacite. (Kunststoff-Rohstoff-Gesellschaft, Berlin. French Patent 472192). Fatty materials or resin soaps are mixed with aldehydes and ketones, or with phenols.

Whaleboline. Organic scrap material is united by means of gelatine, hardened with either formaldehyde or with chromic acid, and then cut up into either plates or strips.

Whalesine. (Ebonite substitute). Split rattan is treated with caoutchouc solution and subsequently vulcanized with sulfur chloride solutions.

Xylonite. Name used in England for celluloid; originated by Daniel Spill.

Zylonite. American form of Xylonite, a celluloid-type plastic. No longer made under that name but applied to pyroxylin plastics in the optical trade of the United States.

—o—

World Production of Pyroxylin

The world production of pyroxylin plastics, according to M. Schueller (Jour. Soc. Chem. Ind. 1925, P. 1144) is between 30 and 40 million kilograms (66 to 88 million pounds). The United States produce from 15 to 20% of the total amount. France, formerly quite a factor in this field, produced only 2¼ million kilograms in 1924. The total consumption of moving picture films is estimated as no less than 425 million meters (almost 1400 million feet!) in each year, which requires 3 million kilograms of cellulose nitrate. The United States consumes approximately 60% of the total film produced.

George H. Heckert, assistant sales manager of A. B. Farquhar Co., Ltd., York, Pa., is handling the hydraulic press territory formerly covered by Paul R. Ketzer.

Production Methods in Molded Insulation
By Werner Urbanus
Starts in May

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